

REMARKS

Applicants request favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

To place the subject application in better form, the specification has been amended to correct minor informalities. Also, a new abstract is presented in accordance with preferred practice. No new matter has been added by these changes.

Claims 1-12 are presented for consideration. Claims 1 and 11 are independent. Claims 1, 4, 7, 8 and 10-12 have been amended to clarify features of the subject invention. Support for these changes can be found in the original application, as filed. Therefore, no new matter has been added.

Applicants request favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claim 8 was rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. Specifically, the Examiner asserted that the specification does not provide adequate support for the recitation in this claim of a plurality of electron guns arrayed in a chamber of one atmosphere. As currently amended, Claim 8 recites “the electron gun comprises a plurality of electron guns arrayed in a single chamber” which recitation has support in the specification at lines 9-27 of page 15 with respect to Fig. 6. Accordingly, it is believed that Claim 8 as currently amended fully meets the requirements of 35 U.S.C. § 112, first paragraph.

Claims 1 and 10-12 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,854,490 to Ooach, et al.. Claim 2 has been rejected under 35 U.S.C. § 103(a)

as being unpatentable over the Ooach, et al. patent in view of U.S. Patent No. 4,199,689 to Takigawa. Claim 3 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ooach, et al. patent in view of U.S. Patent No. 4,467,205 to Beisswenger, et al. Claim 4 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ooach, et al. patent. Claims 5 and 6 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ooach, et al. patent in view of the Beisswenger patent as applied to claim 3 above, and further in view of U.S. Patent No. 5,136,171 to Leung, et al. Claims 7 and 8 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ooach, et al. patent in view of U.S. patent application publication number 2003/0189810 to Hamaguchi, et al. Claim 9 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Ooach, et al. patent in view of the Hamaguchi, et al. publication as applied to claim 7 above, and further in view of the Beisswenger, et al. patent as applied to claim 3 above. Applicants submit that the cited art, whether taken individually or in combination, does not teach or suggest many features of the present invention, as previously recited in claims 1-12. Therefore, these rejections are respectfully traversed. Nevertheless, Applicants submit that independent claims 1 and 11, as presented, amplify the distinctions between the present invention and the cited art.

Independent Claim 1 as currently amended is directed to an electron gun having a cathode portion which emits electrons and an anode portion which accelerates the emission electrons. A bias portion arranged between the cathode and anode portions controls trajectories of the emission structure. A shielding portion arranged below the anode portion shields some of the emission electrons and a cooling portion cools the shielding portion. The bias portion controls

the trajectories of the electrons to form a crossover between the bias portion and the anode portion and prevents the electrons from emitting onto the anode portion.

Independent Claim 11 as currently amended is directed to electron beam exposure apparatus in which an electron beam has a cathode portion which emits electrons and an anode portion which accelerates electrons. A bias portion arranged between the cathode and anode portions controls trajectories of the emission structure. A shielding portion arranged below the anode portion shields some of the emission electrons and a cooling portion cools the shielding portion. The bias portion controls the trajectories of the electrons to form a crossover between the bias portion and the anode portion and prevents like electrons from emitting onto the anode portion. A stage moves in holding a substrate to be exposed by using the emission electrons. The bias portion controls the trajectories of the electrons to form a crossover between the bias portion and the anode portion and prevents like electrons from emitting on the anode portion.

In Applicants' view, Ooaeh, et al., discloses a charged particle beam exposure device in which an electron gun emits an electron beam traveling along a beam axis. The electron gun has a cathode having a tip, the tip having substantially a circular conic shape and a tip surface substantially at the beam axis. A first voltage is applied to the cathode. An anode has a first aperture substantially on the beam axis to which a second voltage higher than the first voltage is applied. A control electrode has a second aperture substantially on the beam axis and a voltage lower than the first voltage is applied to the control electrode to control a current of the cathode. The second aperture is larger than the tip surface. A guide electrode having a third aperture substantially on the beam axis is arranged between the cathode and the anode, and a voltage

higher than the first voltage and lower than the second voltage is applied to the guide electrode. The third aperture is smaller than the tip surface. A lens electrode with a fourth aperture substantially on the beam axis is arranged between the guide electrode and the anode. A voltage lower than the first voltage is applied to the lens electrode to form a cross-over image of the electron beam. The fourth aperture is larger than the third aperture.

According to the invention defined in Claims 1 and 11 as currently amended, the bias portion between the cathode and anode portions controls the trajectories of the emission electrons so as to form a crossover between the bias portion and the anode portion and prevent the electrons from emitting on the anode portion. Advantageously, the electrons emitting on the anode portion are controlled to prevent the anode portion from melting caused by heat generation of the emission electrons.

Ooach, et al. may show in Fig. 7 an electron gun in which electrons emitted from a flat cathode 40 are accelerated by guide electrode 48, lens electrode 42 and anode 41. As clearly disclosed at lines 43-52 of column 12 of Ooach, et al. with respect to Fig. 8a, the operation of the electron gun of Fig. 7 that relies on the guide electrode 48 intercepting the electron beam EB1 and the lens electrode 42 but is devoid of any teaching of a bias portion that controls the trajectories of the emission electrons to prevent the electrons from emitting on the anode portion. Accordingly, it is not seen that Ooach, et al. teaches or suggests the feature of Claims 1 and 11 of a bias portion in an electron gun between cathode and anode portions controls the trajectories of the emission electrons so as to form a crossover between the bias portion and the anode portion

and prevent the electrons from emitting on the anode portion. It is therefore believed that Claims 1 and 11 are completely distinguished from Ooaeh, et al. and are allowable.

Applicants submit that the cited art does not teach or suggest such features of the present invention, as recited in independent claims 1 and 11.

For the foregoing reasons, Applicants submit that the present invention, as recited in independent claims 1 and 11, is patentably defined over the cited art, whether that art is taken individually or in combination.

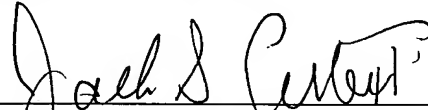
Dependent claims 2-10 and 12 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicants further submit that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicants also request that the Examiner contact his undersigned representative should any matters be deemed outstanding precluding allowance of this application.

Applicants' attorney, Steven E. Warner, may be reached in our Washington, D.C. office by telephone at (202) 530-1010 All correspondence should continue to be directed to our address given below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Jack S. Cubert", written over a horizontal line.

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